

Establishment of routine image interpretation presentation for radiographers in the radiology department, Mzuzu Central Hospital

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Abstract

Objective

By establishing routine image interpretation presentation in the Radiology Department of Mzuzu Central Hospital (MCH), radiographers can conduct technical analysis and quality control of DR, CT among other medical imaging techniques used in clinical practice, which can effectively improve the overall level of radiographers.

Methods

Formulate the general principles of radiographer image interpretation for the Radiology Department: (1) Select typical cases and special cases to analyze the examination methods and image standard interpretation; (2) Select cases that individuals have done relatively satisfactory or unsatisfactory, or even failed to analyze the lessons learned; (3) Select normal cases to identify important imaging anatomy and describe imaging manifestations, so as to improve the basic knowledge level of imaging diagnosis and the ability to interpret images. Secondly, establish an imaging technology reading system under the perspective of new media, and extend it to real-time discussion of technical issues in an online chat group.

Results

(1) Through image interpretation, the overall quality of radiographers have been significantly improved; (2) Through continuous learning of the imaging manifestations of typical cases, the level of imaging diagnosis can be effectively improved; (3) Find out the causes of some failed examinations, put forward rectification suggestions, and avoid mistakes again; (4) Special patients and special patients formulate personalized plans based on common practical experience to quickly complete the examination.

Conclusion

By establishing routine image interpretation presentations for radiographers and incorporating new media perspectives into image interpretation, we have observed higher levels of radiographer participation in learning discussions within technical groups. This approach has significantly improved the comprehensive business capabilities of radiographers and fostered greater unity within the technical team.

Keywords: Radiology Department; Radiographer; Image interpretation presentation; New media

Introduction

In recent years, Malawi has witnessed a rapid advancement in healthcare services and medical imaging technologies. Notably, the first 16-slice spiral CT scanner in the northern region of Malawi was installed at Mzuzu Central Hospital (MCH) in 2019, and the inaugural¹. The magnetic resonance imaging (MRI) scanner is scheduled to become operational by the end of 2024. This proliferation of advanced imaging equipment in support of modern hospitals underscores the heightened demands on professional medical imaging technicians¹. Medical imaging technology, being highly application-oriented and practical, necessitates a seamless integration of theoretical knowledge with practical skills to ensure effective application in clinical settings^{2,3}.

Despite the overwhelming workload encountered, the relentless pace of medical equipment upgrades necessitates that radiographers keep ahead of the times and acquire proficiency in cutting-edge technologies to fully harness

the new functionalities of these devices⁴. Consequently, radiographers must not only grasp the principles underpinning various imaging modalities within their specialty but also demonstrate proficiency in operating diverse imaging systems and navigating through their continuously evolving features⁵. It is imperative that every radiographer participates in the training sessions that ensue the equipment upgrades or software updates, ensuring mastery of operational techniques, specific usage of new functions and technologies. Additionally, establishing online chat groups with engineers and specialists from manufacturer facilitates real-time assistance, which is vital for optimizing imaging techniques demanded by clinicians.

This study aims to emphasize the significance of establishing routine image interpretation presentation among radiographers. Medical imaging technology holds a pivotal position within the realm of medical imaging, with the two disciplines intricately intertwined, mutually reliant, and

mutually enhancing^{6,7}. The advancement of image diagnosis cannot be achieved without the support of advanced imaging techniques. To produce high-quality images more efficiently and accurately, radiographers must continuously reflect on their work, accumulate experience, and share knowledge, thereby facilitating the provision of authentic and precise images to diagnostic radiologists⁸⁻¹⁰. This collaborative effort is crucial in supplying clinicians with objective and comprehensive imaging data essential for disease diagnosis. To expedite the professional growth of junior radiographers in our department, enabling them to work independently and competently to fulfill various clinical examination requests, particularly those involving specified anatomical regions, unique patient conditions, or application of individualized post-processing techniques, the radiographer team, under the guidance of the head of the department, has established routine image interpretation presentation since 2020.

Methods

Firstly, a set of general principles for the image interpretation presentation in radiology department was chosen: (1) Typical cases, analysis of special cases, examination methods and interpretation of imaging standards. (2) Cases that one may think are satisfactory, unsatisfactory, or even a failure, to reflect upon. In particular, all data involving failed cases must be reported truthfully, including patient information, provisional diagnosis, details on examination, failure images, and failure phases. (3) Normal cases that define normal anatomy and imaging manifestations. By interpreting these images, radiographer may benefit from basic knowledge of imaging diagnosis and imaging interpretation capabilities could be improved.

Implementation Details

The image interpretation presentation for radiographers is scheduled for every Friday from 8:00 AM to 9:00 AM, adhering strictly to the general principles mentioned above. The implementation steps are as follows:

(1) Case Selection and Presentation

The discussed cases must be personally completed by radiographers which they deemed meaningful. Relevant information should be meticulously collected and organized, then presented in the form of a slide presentation.

(2) Details for CT Cases

For CT cases, comprehensive records of various parameters, including the patient's weight, contrast agent information (dosage, injection rate, scanning parameters, etc.), are mandatory. These parameters should be introduced at the beginning of the discussion.

(3) Case Announcement

One week prior to the session, the basic information of the cases to be discussed, such as RIS and HIS entry, name, gender, age, referring, department, clinical diagnosis, and the examined body part, are announced in the department's online chat group, the patient's examination request form should be attached if necessary.

(4) Attendance and Sign-in

For each weekly image interpretation presentation, all radiographers, except who are on leave, must attend punctually and sign in.

(5) Moderation and Feedback

The session's host radiographer is responsible for managing attendance and providing comments or evaluations on the discussions.

(6) Documentation and Sharing

After the image interpretation presentation, a dedicated radiographer should compile the learning records and distribute them within the department's online chat group to facilitate further learning.

The presentation of all cases adopt a slide-based format, seamlessly integrated with the Picture Archiving and Communication System (PACS) to showcase the detailed imaging findings. This case-centric and individually curated approach to image interpretation presentation not only enhances the verbal communication and teaching abilities of junior radiographers but also effectively stimulates their enthusiasm and engagement. It fosters a culture in which radiographers are encouraged to meticulously observe each examination during their routine work to assess completeness, rationality, and its adherence to imaging diagnostic requirements and clinical objectives. Upon conclusion of each case review, radiographers are encouraged to share their insights into successful practices or reflect on the reasons behind any flaws. This is followed by critiques from senior instructors, who offer their expertise. In cases where differing opinions arise, all radiographers are invited to engage in an interactive discussion, in a lively and dynamic atmosphere. The presentations accumulate a vast repository of various examination methods for both typical and challenging cases, accompanied by clear images, essential clinical information, descriptive imaging manifestations completed with the senior radiographers' insightful comments as the finishing touch. Undoubtedly, this approach contributes significantly to the self-improvement and professional development of radiographers junior and senior alike.

Secondly, with the continuous advancement and refinement of internet technology, conducting image interpretation presentation within the context of new media has emerged as a new trend. Internet enables the timely and efficient uploading of various data and information to our department's online chat group. The constant upgrading and expansion of imaging equipment in our department, coupled with the demanding clinical workload, necessitate innovations in the image interpretation presentation. Specifically, we have established an online chat group to facilitate handovers and real-time discussions of technical issues within the group. This not only preserves the tradition of our image interpretation presentation but also allows for instant communication and collaboration on technical matters. Similarly, when confronted with challenging situations during work, we can promptly seek assistance and engage in discussions within the group, facilitating prompt resolution of issues and ensuring the safe completion of patient examinations. This approach not only motivates junior radiographers but also encourages full participation, unconstrained by time or space limitations. By combining theoretical knowledge with practical experience, participants gain a deeper understanding of the importance and necessity of image interpretation presentation, shifting from passive learning to actively seeking knowledge. Furthermore, they are encouraged to share their acquired knowledge and observations openly, reflecting their personal value and

professional proficiency while strengthening the cohesion and unity within the team.

Results

Through the implementation of routine image interpretation presentation, the overall quality of radiographers has significantly improved, manifested in a more proactive work ethic and eagerness to engage in answering various questions. Upon completing their assigned examinations, radiographers actively offer assistance to colleagues, collaboratively ensuring the timely completion of all patient examinations. Furthermore, routinely summarized issues discussions, foster mutual growth and progress among radiographers.

The discussion and analysis of specific case examination methods have fully leveraged the expertise of radiographers at all levels, enabling them to confidently handle similar problems in the future. Continuous learning of the clinical symptoms, signs, and imaging manifestations of typical cases has effectively enhanced diagnostic capabilities, laying a solid foundation for the transition towards radiographer-led diagnosis. This, in turn, leads to the development of more rational examination protocols tailored to clinical conditions, transcending the traditional approach of mere photography and scanning, and yielding superior image quality with enhanced clinical application value¹¹.

For cases where examinations were unsuccessful, thorough analysis and discussion were conducted to identify the underlying causes and propose corrective measures, effectively preventing recurrence and mitigating potential medical safety breaches, or even accidents.

For special patient populations (e.g., patients with mental conditions, deaf-mute individuals, infants, and young children) and unique physical conditions (e.g., severe obesity, severe spinal deformities, external fixation devices), based on collective practical experience and with the performance of each imaging device taken into account, personalized protocols were devised that are readily adoptable and applicable by radiographers at all levels¹². These protocols were iteratively verified, adjusted, and updated within the online chat group, ensuring working effectiveness, particularly during night shifts and emergency response scenarios. When necessary, radiographers refer to pre-established work plans and procedures, providing one-stop services that strictly adhere to examination form, minimizing the risk of missed or incomplete examinations, and reducing patient wait times, ultimately providing clinicians with objective imaging data crucial for patient management.

Conclusion

The adoption of a participatory approach, where individuals engage in case collection, creating slide presentations, presenting, and analyzing various examination methods, significantly enhances radiographers' abilities to analyze and address problems. This process, particularly the sharing of failed case examination methods, is a pivotal route for advancing the professional competency of radiologic technologists. By comparing the strengths, limitations, and even shortcomings of different parameter configurations using real-life images, radiographers gain a deeper understanding of examination techniques and imaging standards.

Moreover, this collaborative approach fosters a unified perspective among radiographers, enabling them to jointly develop learning plans, teaching outlines, and training

programs. This ensures consistency in mentoring practices, facilitating a gradual progression of knowledge from basic to advanced levels, and promoting equitable and individualized instruction. Such an environment is conducive to new hires and interns rapidly mastering the standardized operation of various imaging equipment.

Based on the department's technical personnel structure, equipment utilization, workflow, patient volume, and diagnostic requirements, the establishment of a robust and implementable image interpretation presentation markedly enhances radiographers' practical skills, enabling them to better serve the needs of precision imaging.

The integration of new media platforms, such as image interpretation presentation and learning discussions within online chat groups, has brought about convenience in terms of time and space. This has led to increased participation from radiographers, resulting in notable improvements in their comprehensive professional capabilities. Furthermore, it has fostered a more cohesive and harmonious technical team, making this approach worthy of widespread adoption.

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